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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/042,829	01/08/2002	Chi Wah Cheng	P/4076-10	7316

2352 7590 11/19/2003

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EXAMINER	
STONER, KILEY SHAWN	

ART UNIT	PAPER NUMBER
1725	

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/042,829	CHENG ET AL.	
	Examiner	Art Unit	
	Kiley Stoner	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-40 and 42-51* is/are pending in the application.

4a) Of the above claim(s) *25,38-40 and 42-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-35,37 and 51* is/are rejected.

7)☒ Claim(s) *36* is/are objected to.

8)☒ Claim(s) *25-40 and 42-51* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

The drawings were received on 10-17-03. These drawings are approved by the Examiner.

Claim Objections

Claims 30 and 34 are objected to because of the following informalities:

In claim 30, line 2 the phrase "the motion of the container is positioning and driven" is nonidiomatic language. Appropriate correction is required.

In claim 34 "mans" must be changed to –means--.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 26 and 32 are rejected under 35 U.S.C. 102(e) as being anticipated by Cobbley et al. (6,268,275). The intended use of the instantly claimed apparatus is

noted, however, the intended use does not patentably distinguish said claimed apparatus over the prior art.

Cobbley et al. teaches a positioning member (30, particularly the openings in the stencil) which is constructed and configured to direct the solder balls to required positions corresponding to the array of positions the solder balls are to take up on the substrate (Figure 4, #30); a container for a plurality of solder balls (50/50A); the container being configured and operable to move in a first direction from a first position remote from the positioning member to a second position directly in communication with the positioning member to provide solder balls to the positioning member, and to move in a second direction opposite to the first direction from the second position to the first position to move the solder balls not in required positions away from the positioning member (Figure 4, particularly #68); and a mechanism constructed and configured (46) to apply a force to the solder balls in the container in the direction of movement of the container as the container moves between the first position and the second position (column 3, lines 16-31); the positioning member includes a ball template with a plurality of apertures each slightly larger that the size of a solder ball in order to capture solder balls with in the template, and wherein the plurality of apertures are arranged in an order similar to the array positions comprising solder pads on the substrate (Figure 4).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 27-29, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cobbley et al. (6,268,275) as applied to claim 26, further in view of Ooroku et al. (6,413,850 B1).

Cobbley et al. teaches all of the limitations of the claims except the mechanism to apply a force to the solder balls comprises a tilting mechanism adapted to rotate the container about an axis perpendicular to the direction of motion of the container and thereby tilt it; the container and positioning member are rotatable a plurality of times when the container is in position directly over the positioning member, so that the solder balls are repeatedly spread over the positioning member; and rotational angles of the container and/or the moving speed of the container are controllable to optimize the efficiency of the apparatus; and the plurality of apertures are located substantially toward one end of the positioning member whereby the container is in communication with the apertures on the positioning member only while the container is in the vicinity of the second position.

In Figure 4, Ooroku et al. teaches tilting means adapted to rotate the container about an axis perpendicular to the direction of motion of the container to thereby tilt it. The mechanism used to tilt the container of Ooroku et al. is capable of rotating the container and the positioning means a plurality of times when the container is in position directly over the positioning means.

In addition Ooroku et al. teaches the rotational angles of the container and/or the moving speed of the container are controllable to optimize efficiency (column 9, lines 33-38 *and column 10, lines 47-65); and the plurality of apertures are located* substantially toward one end of the positioning member whereby the container is in communication with the apertures on the positioning member only while the container is in the vicinity of the second position (Figures 5-6).

FIG. 4

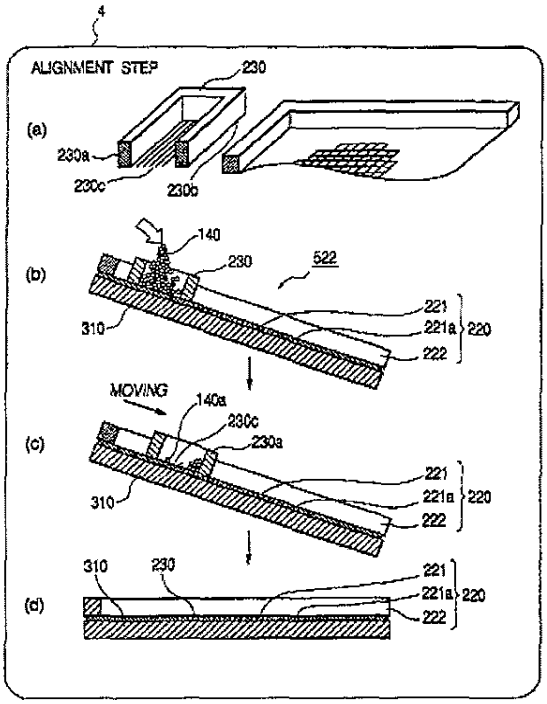


FIG. 5

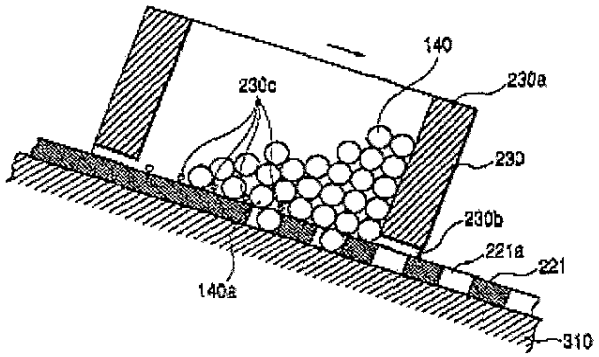
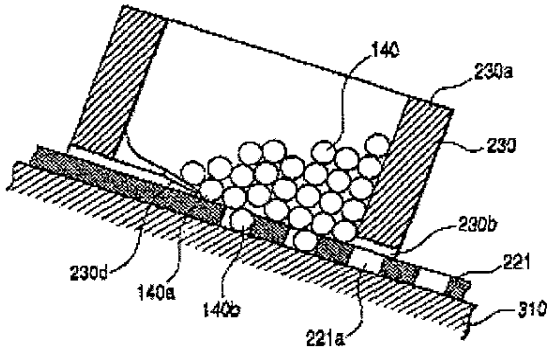


FIG. 6



At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the tilting mechanism of Ooroku et al. with the solder ball placing *apparatus of Cobbley et al. in order to aid in the placement of the solder balls into the* openings of the stencil.

Claims 27-31 and 33-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cobbley et al. (6,268,275) as applied to claim 26, further in view of *Kasai et al. (6,390,351 B1). The intended use of the instantly claimed apparatus is* noted, however, the intended use does not patentably distinguish said claimed

apparatus over the prior art. Cobbley et al. teaches the apertures comprise through-holes which allow solder balls to fall through the ball template directly onto a substrate placed below it (Figure 4).

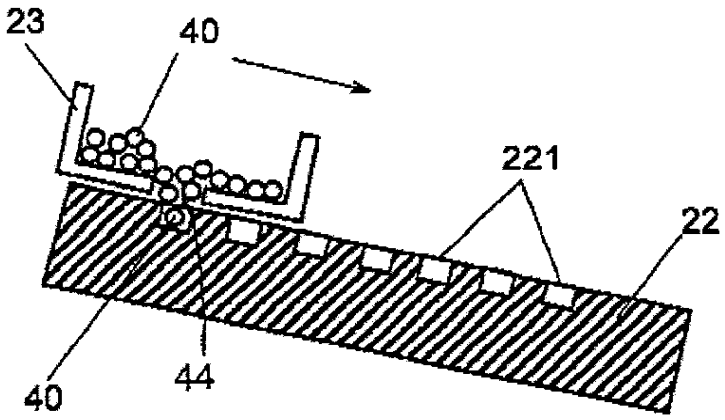
Cobbley et al. does not teach the mechanism to apply a force to the solder balls comprises a tilting mechanism adapted to rotate the container about an axis perpendicular to the direction of motion of the container and thereby tilt it; the container and positioning member are rotatable a plurality of times when the container is in position directly over the positioning member, so that the solder balls are repeatedly spread over the positioning member; the rotational angles of the container and/or the moving speed of the container are controllable to optimize the efficiency of the apparatus; there is a positioning rail and motor whereby the motion of the container is positioning and driven; a vibration-generating device to facilitate the separation of solder balls from surfaces they are in contact with and/or from one another; solder balls captured in the plurality of apertures are removable by a pick-and-place device while retaining their respective positions, and places onto corresponding positions of solder pads on the substrate; means to rotate the container, ball template and substrate simultaneously; the apertures comprises through-holes which allow solder balls to fall through the ball template directly onto a substrate placed below it.

Kasai et al. teaches a guide member which is configured to direct the solder balls to positions corresponding to the array of positions the solder balls are to take up on the substrate (Figure 9, specifically #22); a container for a plurality of solder balls, the container being movable between a first position remote from the guide member and a

second positioned directly in communication with the guide member (Figure 9, specifically #23); a mechanism configured to apply a force to the solder balls in the container in the direction of movement of the container as the container moves between the first position to the second position (Figure 9). On page 4, lines 5-9 and page 7, lines 1-19 of the specification the applicant uses a gravitational force and the force generated by the walls of the container during movement to bias the solder balls in the direction of movement of the container. The mechanism that Kasai et al. uses to move the container #23 applies force to the solder balls through both gravity and the side walls of the container #23. Figure 9 also teaches tilting means adapted to rotate the container about an axis perpendicular to the direction of motion of the container to thereby tilt it. The mechanism used to tilt the container of Kasai et al. is capable of rotating the container and the positioning means a plurality of times when the container is in position directly over the positioning means; In addition Kasai et al. teaches the rotational angles of the container and/or the moving speed of the container are controllable to optimize efficiency (column 5, lines 35-46); a positioning rail and motor whereby the motion of the container is guided and driven (column 4, lines 3-9 and column 5, lines 35-46); a vibration-generating device to facilitate the separation of solder balls from surfaces they are in contact with and/or from one another (column 5, lines 21-27); the positioning means includes a ball template with a plurality of apertures each slightly larger that the size of a solder ball in order to capture solder balls with in the template, and wherein the plurality of apertures are arranged in an order similar to the array positions comprising solder pads on the substrate; solder balls captured in the

plurality of apertures are removable by a pick-and-place device while retaining their respective positions, and places onto corresponding positions of solder pads on the substrate; means to rotate the container, ball template and substrate simultaneously; the apertures comprises through-holes which allow solder balls to fall through the ball template directly onto a substrate placed below it (Figures 6A-B and 9).

FIG. 9



At the time of the invention it would have been obvious to one of ordinary skill in the art to combine the tilting mechanism of Kasai et al. with the solder ball placing apparatus of Cobbley et al. in order to aid in the placement of the solder balls into the openings of the stencil.

Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cobbley et al. (6,268,275 B1) as applied to claim 26 above, and further in view of Fjelstad (6,253,992 B1). Cobbley et al. teaches all of the limitations of the claims except the

container is closed at the top to reduce oxidation of the solder balls and open at the bottom for direct entry of the balls to the positioning member substantially throughout the bottom of the container.

Fjelstad teaches the container is closed at the top to reduce oxidation of the solder balls and open at the bottom for direct entry of the balls to the positioning member substantially throughout the bottom of the container (Figure 2 and column 6, lines 6-7).

At the time of the invention it would have been obvious to combine the lid of Fjelstad with the container of Cobbley et al. in order to hold the solder balls in the container.

Allowable Subject Matter

Claim 36 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claims 26-37 and 51 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is (703) 305-0723. The examiner can normally be reached on Monday-Thursday (7:30 a.m. to 6:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on Monday-Friday. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Kiley Stoner A.U. 1725
Kiley Stoner 11/12/03